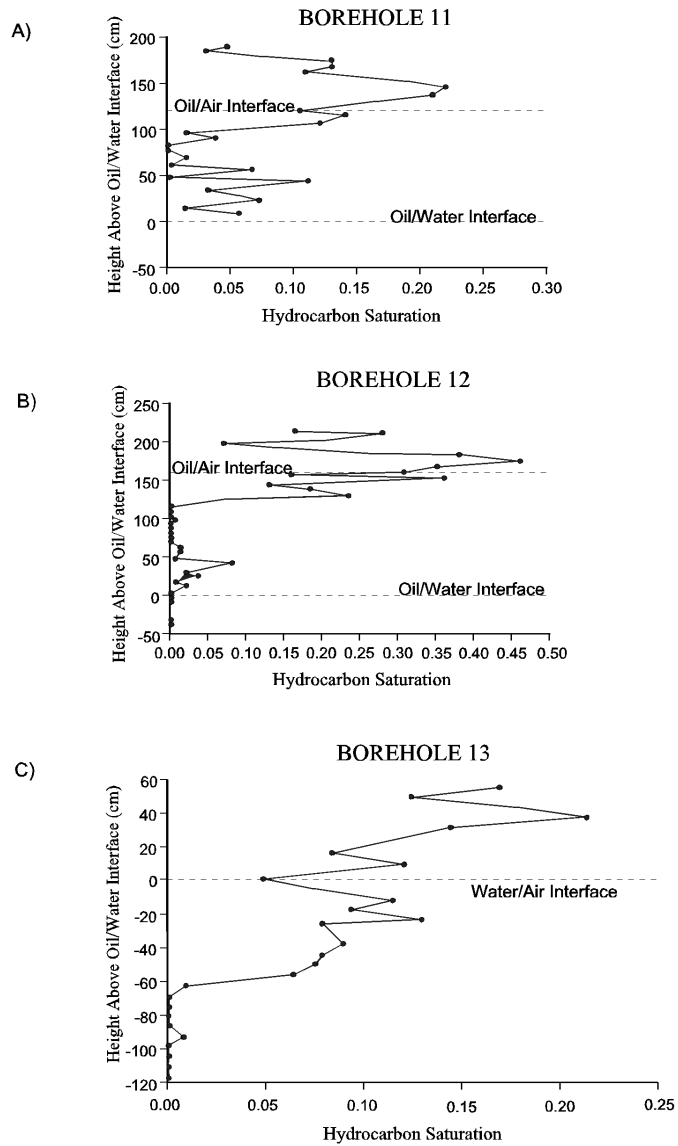


## Exhibit IV-8

### Measured Hydrocarbon Saturation Profiles At Three Boreholes Showing Variability Due To Vertical Heterogeneity



Source: From Huntley, et. al., 1992

## Exhibit IV-9

### Calculation Procedure To Convert TPH Data From Soil Samples To Hydrocarbon Saturations

TPH analysis results for soil samples may be converted to hydrocarbon saturation by the following equation:

$$S_o = TPH \frac{(1-f)r_{gr} \times 10^{-6} \frac{kg}{mg}}{f r_o}$$

where:

- $S_o$  = total hydrocarbon saturation (dimensionless)
- TPH = total petroleum hydrocarbon concentration in mg/kg
- $r_{gr}$  = grain density (typically 2.65 g/cm<sup>3</sup>)
- $f$  = porosity (dimensionless)
- $r_o$  = density of the hydrocarbon, liquid (g/cm<sup>3</sup>).

This equation applies to both the unsaturated and saturated zones.

The amount of free hydrocarbon present can be calculated if residual hydrocarbon saturation is known or estimated. Usually residual saturations are not known or measured, but literature values (e.g., Mercer and Cohen, 1990) can be used as estimates. The free hydrocarbon saturation is given by:

$$S_{of} = S_o - S_r$$

where:

- $S_{of}$  = free hydrocarbon saturation
- $S_r$  = residual hydrocarbon saturation.